REMARKS

Claims 2-15 and 17-24 are active. Claim 16 is canceled. The claims are subject to restriction wherein claims 2-16 are withdrawn from consideration as being directed to a non-elected invention. Claims 17 and 19 are objected to based on formal matters. Claims 17-19 and 21-23 are rejected under 35 :USC 112, second paragraph. Claims 17-24 are rejected under 35 USC 103 as being unpatentable over Drury '024 and Schmidt '881.

Receipt is acknowledged of the papers submitted under 35 USC 119.

INFORMAL MATTERS

Certain of the claims have been amended to meet the objections to the formal matter issues.

Claim 17 is amended as suggested and includes other amendments to meet the objections thereto and to improve the form of the claim. No new matter is introduced. While certain of the objections are based more on personal style of the Examiner with respect to grammar, which are not objectionable, the suggested changes are made to advance the prosecution of this application.

The Action states as originally presented there is insufficient antecedent basis for the other claims if the suggested changes are not made. Applicants disagree that the language "which truncated conical through plating" is grammatically incorrect or indefinite. There is nothing wrong with this terminology. One of ordinary skill would understand the claim and construe it properly and that is all that is required by 35 USC 112. The MPEP also concurs that where claims are clear on their face that objections need not be met with amendments. See the MPEP 2173.02 page 2100-219 where it is

stated an applicant does not have to adopt the examiner's suggestions made based on personal judgment.

The terminology of certain of the other claims is amended to meet the objections based on 35 USC 112. Certain of these objections are traversed as improper and no amendment is made. For example, claims 18 and 23 are rejected in calling for ohmically coupled or ohmic contact. The Action states the specification fails to disclose the electrical contact is an ohmic contact and thus may include a Schottky contact. This rejection is unsound and is traversed. The application and claims are directed to those of ordinary skill. Enclosed herewith are copies of Wikipedia definitions of a Schottky barrier and an Ohmic contact. A Schottky barrier is described in the enclosed as a metal-semiconductor junction with rectifying characteristics. Applicants' specification does not describe such rectifying junctions.

Applicants' specification at pag e1, lines 8-22, states "The system for producing through – platings (vias formation) for polymer electronics permits conductive connections to be made between layers in different levels of components. " "Those through platingsare essential for the production of integrated circuits." One of ordinary skill would understand "conductive connections" and "integrated circuits" per se do not form rectifying junctions unless expressly disclosed and referred to as such. The Action refers to the disclosure as disclosing an "electrical contact." An electrical contact without more is not a Schottky barrier contact which requires the contact to form a rectifying junction not inherent in the term "contact."

The specification at page 4, lines 12-14, states "Figure 2 shows . . . the free standing through-plating 3 which is applied on a lower conductor track and/or layer 2."

Plainly one of ordinary skill would construe the Fig. 2 embodiment of the plating 3 on the conductor track 2 as an ohmic contact . These are two metals in electrically conductive contact. They do not form a rectifying junction. The Wikipedia article states:

> "A metal-semiconductor junction that does not rectify current is called an 'Ohmic contact.' "

Nowhere in applicants' specification is a metal-semiconductor junction described as a rectifying junction. Therefore by definition it is an ohmic contact. An Ohmic contact is also described by Wikipedia as follows:

> "An **ohmic contact** is a region on a semiconductor device that has been prepared so that the current –voltage (I-V) curve of the device is linear and symmetric. If the I-V characteristic is non-linear and asymmetric, the contact can instead be termed blocking or Schottky contact."

It is plain from applicants' figures that the contact between the through plating and other elements is not non-linear as such would need to be expressly described as such. This is not the case. Thus the contacts must by definition be linear and "ohmic." This is how one of ordinary skill would construe the connections in applicants' claims and specification.

An ohmic contact is inherent in the disclosure. See the MPEP2167.07(a), copy enclosed, describing inherency. Mere possibilities are not inherent. The so called Schottky diode junction is a mere possibility, i.e., it may or may not be present in applicants' disclosure and thus can not be inherent. However, the ohmic contact must always be present, and is not a mere possibility, by the above definitions, and thus must be inherent. An electrical contact is always an ohmic contact (resistive and linear) unless it is expressly described as being otherwise. This basis of the rejection is in error and should be withdrawn.

With respect to the term "hollow" the claims with this term are amended to delete this term.

The remaining claims rejected under 35 USC 112 have been amended accordingly. The objections based on formal matters are believed met and this basis of the objections and rejections should be withdrawn.

The restriction

Applicants traverse the restriction as improper. The Action states that claims 2-16 (claim 16 is canceled) are directed to an invention that lacks unity with the invention as originally claimed subject matter of claims 17-24. The Action states that the disclosed structures comprise either a truncated conical through plating or a disruption element and a void and are exclusive of each other. However, the restriction is between claims 17-24 and claims 2-15. Not all of claims 2-15 are limited to only the disruption element.

Claims 2, 3, 14, and 15 each call for the truncated conical cross section of claims 17-24 and therefore have a common technical feature and should not be restricted from claims 17-24. This basis of the restriction is in error as to these claims and should be withdrawn.

The substantive rejections

Amended Claim 17

This claim is rejected as unpatentable over Drury and Schmidt. This claim calls for:

> at least one through plating having a truncated conical cross-sectional profile which extends from the lower layer through at least the central layer transversely to the central layer (underlining added)

This claim structure is not shown, suggested or otherwise disclosed by Drury '024

and/or Schmidt, alone or incombination. '024 discloses a vertical interconnect area 104 in a laminate comprising a stack 10 of areas 3-6. A tapered tool tip 20 has a radius 21 at angle 22, Fig. 4, (col. 4, line 58-col. 5, line 18) foming a notch. Since the tool tip 20 is tapered and has a curve formed by a radius 21 (col. 5, line 6), the interconnect area by definition must be conical, i.e., a cone. See Fig. 2 wherein the plan view of the interconnect area is circular. Obviously a circular in section tapered region defines a cone.

The claim calls for a truncated cone which is not shown or disclose or otherwise described by Drury as admitted by the Action in citing Schmidt as disclosing a truncated cone. The Drury reference is foreign to amended claim 1.

Schmidt is of no help. And is cumulative with Drury. The Action states that Schmidt teaches a truncated conical cross sectional platings as elements 11, 11', Fig. 2g. Applicants disagree with this conclusion. The elements 11, 11' are not truncated conical shapes (frusto-conical). The Action does not present a reasonable convincing line of reasoning as to why the arrow shaped configurations of Schmidt are deemed truncated conical in shape. The Examiner is respectfully requested to research the shape of a frusto-conical element in the published literature, and which is not shown in the cited references.

The elements 11, 11' have two portions, a top portion and a lower shank portion on which and to which the top portions are connected and part of. The top portions are conical in the form of an arrow head and are not frusto-conical in shape as claimed. But there is also a bottom portion connected to the top portion and that is circular cylindrical. These two portions need to be considered as one structure and not as separate

structures.

The recesses 3, 3', are described as circular windows, col. 2, lines 32-33, which are thus circular cylinders and not frusto conical. They also may be rectangular and not even circular but grooves, lines 37-38. There is no truncated conical shape disclosed. The bottom circular cylinder is not that and neither is the top arrow head portion. However, these portions separately do not form the disclosed structure, but only as a combination. The top and bottom portions are not truncated cones and neither is their combination such a shape which is more complex than the top and bottom portions alone and certainly not frusto-conical as claimed. Thus, these references are foreign to claim 17 and taken singly or in combination, do not disclose or suggest claim 17, which is believed allowable.

The remaining claims that depend from claim 17 include all of the structure therein and are believed allowable at least for these reasons in addition to the structure not shown or suggested in the cited references. Dependent claims 2, 3 and 14 include similar subject matter as claim 17 and are believed allowable for similar reasons.

Since applicants have shown claims 2, 3, 14 and 17-24 to be in proper form for allowance, such action is respectfully requested.

Since the amendments are all made to correct formal matters, and no substantive amendments are made, no new issues are raised by the amendments and entry of this paper is respectfully requested.

The Commissioner is authorized to charge or credit deposit account 03 0678 for any under or over payments in connection with this paper including a one month extension of time to respond by July 14, 2008.

Respectfully submitted,
Wolfgang Clemens et al.

July 10, 2008

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and a definition is added to the application, it must be clear from the application as filed that applicant intended a particular definition, in order to avoid an issue of new matter and/or lack of written description. See, e.g., *Scarring Corp. v. Megan, Inc.*, 222 F.3d 1347, 1352-53, 55 USPQ2d 1650, 1654 (Fed. Cir. 2000). In *Scarring*, the original disclosure drawn to recombinant DNA molecules utilized the term "leukocyte interferon." Shortly after the filing date, a scientific committee abolished the term in favor of "IFN-(a)," since the latter term more specifically identified a particular polypeptide and since the committee found that leukocytes also produced other types of interferon. The court held that the subsequent amendment to the specification and claims substituting the term "IFN-(a)" for "leukocyte interferon" merely renamed the invention and did not constitute new matter. The claims were limited to cover only the interferon subtype coded for by the inventor's original deposits.

II. OBVIOUS ERRORS

An amendment to correct an obvious error does not constitute new matter where one skilled in the art would not only recognize the existence of error in the specification, but also the appropriate correction. *In re Odd*, 443 F.2d 1200, 170 USPQ 268 (CCPA 1971).

Where a foreign priority document under 35 U.S.C. 119 is of record in the U.S. application file, applicant may not rely on the disclosure of that document to support correction of an error in the pending U.S. application. *Ex parte* *>*Bondiou*<, 132 USPQ 356 (Bd. App. 1961). This prohibition applies regardless of the language of the foreign priority documents because a claim for priority is simply a claim for the benefit of an earlier filing date for subject matter that is common to two or more applications, and does not serve to incorporate the content of the priority document in the application in which the claim for priority is made. This prohibition does not apply where the U.S. application explicitly incorporates the foreign priority document by reference. For applications filed on or after September 21, 2004, where all or a portion of the specification or drawing(s) is inadvertently omitted from the U.S. application, a claim under 37 CFR 1.55 for priority of a prior-filed foreign application that is present on the filing date of the application is considered an incorporation by reference of the prior-filed foreign application as to the inadvertently omitted portion of the specification or drawing(s), subject to the conditions and requirements of 37 CFR 1.57(a). See 37 CFR 1.57(a) and MPEP § 201.17.

Where a U.S. application as originally filed was in a non-English language and an English translation thereof was subsequently submitted pursuant to 37 CFR 1.52(d), if there is an error in the English translation, applicant may rely on the disclosure of the originally filed non-English language U.S. application to support correction of an error in the English translation document.

2163.07(a) Inherent Function, Theory, or Advantage

By disclosing in a patent application a device that inherently performs a function or has a property, operates according to a theory or has an advantage, a patent application necessarily discloses that function, theory or advantage, even though it says nothing explicit concerning it. The application may later be amended to recite the function, theory or advantage without introducing prohibited new matter. *In re Reynolds*, 443 F.2d 384, 170 USPQ 94 (CCPA 1971); *In re Smythe*, 480 F. 2d 1376, 178 USPQ 279 (CCPA 1973). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted).

2163.07(b) Incorporation by Reference [R-3]

Instead of repeating some information contained in another document, an application may attempt to incorporate the content of another document or part thereof by reference to the document in the text of the specification. The information incorporated is as much a part of the application as filed as if the text was repeated in the application, and should be treated as part of the text of the application as filed. Replacing the identified material incorporated by reference

Schottky barrier

From Wikipedia, the free encyclopedia

A **Schottky barrier** is a metal-semiconductor junction which has rectifying characteristics, suitable for use as a diode. The largest differences between a Schottky barrier and a p-n junction are its typically lower junction voltage, and decreased (almost nonexistent) depletion width in the metal.

Not all metal-semiconductor junctions are Schottky barriers. A metal-semiconductor junction that does not rectify current is called an Ohmic contact. Rectifying properties depend on the metal's work function, the band gap of the intrinsic semiconductor, and the type and concentration of dopants in the semiconductor. Design of semiconductor devices requires familiarity with the Schottky effect to ensure Schottky barriers are not created accidentally where an ohmic connection is desired.

Advantages

Schottky barriers, with their lower junction voltage, find application in areas where a device better approximating an ideal diode is desired. They are also used in conjunction with normal diodes and transistors, where their lower junction voltage is used for circuit protection (among other things).

Because one of the materials in a Schottky diode is a metal, lower resistance devices are often possible. In addition, the fact that only one type of dopant is needed may greatly simplify fabrication.

Overall, however, Schottky devices find only limited application compared to other semiconductor technologies.

Devices

A Schottky barrier as a device by itself is known as a Schottky diode.

A bipolar junction transistor with a Schottky barrier between the base and the collector is known as a Schottky transistor. Because the junction voltage of the Schottky barrier is small, the transistor is prevented from saturating too deeply, which improves the speed when used as a switch. This is the basis for the Schottky and Advanced Schottky TTL families, as well as their low power variants.

A MESFET, or Metal-Semiconductor FET, is a device similar in operation to the JFET, which utilizes a reverse biased Schottky barrier to provide the depletion region. A particularly interesting variant of this device is the HEMT, or High Electron Mobility Transistor, which also utilizes a heterojunction to provide a device with extremely high conductance.

Schottky barriers are commonly used also in semiconductor electrical characterization techniques. In fact, in the semiconductor, a depletion region is created by the metal electrons, which "push" away semiconductor electrons (simplification, see depletion region article). In the depletion region, dopants remain ionized and give rise to a "space charge" which, in turn, give rise to a capacitance of the junction. The metal-semiconductor interface and the opposite boundary of the depleted area act like two capacitor plates, with the depletion region acting as a dielectric. By applying a voltage to the junction it is possible to vary the depletion width: if we reverse bias the junction, the dopants electrons will be emitted and pushed away; if we forward bias the junction, the electrons will be captured. By analyzing the emission and capture of electrons by dopants (or, more frequently, by crystallographic defects or dislocations, or other electron traps) is possible to characterize the semiconductor material. The most popular electrical characterization

techniques that use this type of junction are DLTS and CV profiling.

A Schottky barrier carbon nanotube FET uses the nonideal contact between a metal and a carbon nanotube (CNT) to form a Schottky barrier that can be used to make Schottky diodes or transistors, or so on. The scaling of semiconductor devices to ever-smaller sizes is rapidly approaching fundamental limits. Carbon nanotubes may become a practical alternative to customary devices due to their small size and unique mechanical and electronic properties.

See also

- Ohmic contact
- Schottky diode
- Diode
- Metal-induced gap states

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Categories: Semiconductors

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Ohmic contact

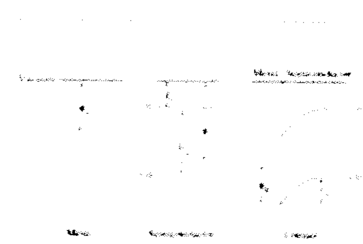
From Wikipedia, the free encyclopedia

An **ohmic contact** is a region on a semiconductor device that has been prepared so that the current-voltage (I-V) curve of the device is linear and symmetric. If the I-V characteristic is non-linear and asymmetric, the contact can instead be termed a **blocking** or Schottky contact. Typical ohmic contacts on semiconductors are sputtered or evaporated metal pads that are patterned using photolithography. Low-resistance, stable contacts are critical for the performance and reliability of integrated circuits and their preparation and characterization are major efforts in circuit fabrication.

Contents

Theory

The Fermi level (or strictly speaking, chemical potential) of any two solids in contact must be equal in thermal equilibrium. The difference between the Fermi energy and the vacuum level is termed the work function. A contact metal and a semiconductor can have different work functions, φ_M and φ_S respectively. If so, when the two materials are placed in contact, electrons will flow from the one with the lower work function until the Fermi levels equilibrate. As a result, the material with the lower work function will take on a slight positive charge while that with the higher work function will become slightly negative. The resulting electrostatic potential is termed the **built-in field** designated by V_{bi}. This **contact potential** will occur between any two solids and is the underlying cause of phenomena such as ectification in diodes and the Seebeck effect. The built-in field is the cause of **band-bending** in the semiconductor near he junction. Noticeable band-bending does not occur in most metals since their very short screening length means that ny electrical field extends only a short distance beyond the interface.



An ohmic contact or Schottky barrier is formed when a metal and a p-type semiconductor are brought into contact.

n a classical physics picture, in order to surmount the barrier, a carrier in the emiconductor must gain enough energy to jump from the Fermi level to the top of the ent conduction band. The needed barrier-surmounting energy φ_B is the sum of the uilt-in potential and the offset between the Fermi level and the conduction band. quivalently for n-type semiconductors, $\varphi_B = \varphi_M - \chi_S$ where χ_S is the semiconductor's lectron affinity, defined to be the difference between the vacuum level and the onduction band (CB) level. For p-type materials, $\varphi_B = E_g - (\varphi_M - \chi_S)$ where E_g is the andgap. When the excitation over the barrier is thermal, the process is called ermionic emission. An equally important process in real contacts is quantum echanical tunneling. The WKB approximation describes the simplest picture of nnelling in which the probability of barrier penetration is exponentially dependent n the product of the barrier height and thickness. In the case of contacts, the thickness given by the **depletion width**, which is the length scale that the built-in field penetrates into the semiconductor. The idth of the depletion layer W can be calculated by solving Poisson's equation and considering the presence of dopants

in the semiconductor:

$$\nabla^2 V = \frac{\rho}{\epsilon}$$

where in MKS units ρ is the net charge density and ε is the dielectric constant. The geometry is one-dimensional since the interface is assumed to be planar. Integrating the equation once, we get

$$\frac{dV}{dx} = \frac{\rho x}{\epsilon} + C_0$$

The constant of integration $C_0 = \frac{-\rho W}{\epsilon}$ due to the definition of the depletion width as the length over which the interface is fully screened. Then

$$V(x) = \frac{\rho}{2\epsilon}x^2 - \frac{\rho W}{\epsilon}x + V_{bi}$$

where the fact that $V(0) = V_{bi}$ has been used to fix the remaining integration constant. This equation for $V(x)$ describes the dashed blue curves in the right-hand panels of the figures. The depletion width can then be determined by setting $V(W) = 0$ which results in

$$W = \sqrt{\frac{2\epsilon V_{bi}}{\rho}}$$

For $0 < x < W$, $\rho = eN_{dopant}$ is the net charge density of ionized donor or acceptors N_{dopant} in the completely **depleted** semiconductor and e is the electronic charge. ρ and V_{bi} have positive signs for n-type semiconductors and negative signs for p-type semiconductors giving the positive curvature $V''(x)$ for n-type and negative curvature for p-type as shown in the figures.

Note from this crude derivation that the barrier height (dependent on electron affinity and built-in field) and barrier thickness (dependent on built-in field, semiconductor dielectric constant and doping density) can only be modified by changing the metal or changing the doping density. In general an engineer will choose a contact metal to be conductive, non-reactive, thermally stable, electrically stable and low-stress, and then will increase the doping density below the contact to narrow the width of the barrier region. The highly doped regions are termed n^+ or p^+ depending on the carrier type. Since the transmission coefficient in tunneling depends exponentially on particle mass, semiconductors with lower effective masses are more easily contacted. In addition, semiconductors with smaller bandgaps more readily form ohmic contacts because their electron affinities (and thus barrier heights) tend to be lower.

The simple theory presented above predicts that $\varphi_B = \varphi_M - \chi_S$, so naively metals whose work functions are close to the semiconductor's electron affinity should most easily form ohmic contacts. In fact, metals with high work functions form the best contacts to p-type semiconductors while those with low work functions form the best contacts to n-type semiconductors. Unfortunately experiments have shown that the predictive power of the model doesn't extend much beyond this statement. Under realistic conditions, contact metals may react with semiconductor surfaces to form a compound with new electronic properties. A contamination layer at the interface may effectively widen the barrier. The surface of the semiconductor may reconstruct leading to a new electronic state. The dependence of contact resistance on the details of the interfacial chemistry is what makes the reproducible fabrication of ohmic contacts such a

manufacturing challenge.

Preparation and characterization of ohmic contacts

The fabrication of ohmic contacts is a much-studied part of materials engineering that nonetheless remains something of an art. The reproducible, reliable fabrication of contacts relies on extreme cleanliness of the semiconductor surface. Since a **native oxide** rapidly forms on the surface of silicon, for example, the performance of a contact can depend sensitively on the details of preparation.

The fundamental steps in contact fabrication are semiconductor surface cleaning, contact metal deposition, patterning and annealing. Surface cleaning may be performed by sputter-etching, chemical etching, reactive gas etching or ion milling. For example, the native oxide of silicon may be removed with an HF dip, while GaAs is more typically cleaned by a bromine-methanol dip. After cleaning metals are deposited via sputter deposition, evaporation or chemical vapor deposition (CVD). Sputtering is a faster and more convenient method of metal deposition than evaporation but the ion bombardment from the plasma may induce surface states or even invert the charge carrier type at the surface. For this reason the gentler but still rapid CVD is increasingly preferred. Patterning of contacts is accomplished with standard photolithographic methods such as **lift-off,** where contact metal is deposited through holes in a photoresist layer that is later dissolved away. Post-deposition annealing of contacts is useful for relieving stress as well as for inducing any desirable reactions between the metal and the semiconductor.

The measurement of contact resistance is most simply performed using a four-point probe although for more accurate determination, use of the transmission line method is typical.

Technologically important kinds of contacts

Modern ohmic contacts to silicon such as titanium-tungsten disilicide are usually silicides made by CVD. Contacts are often made by depositing the transition metal and forming the silicide by annealing with the result that the silicide may be non-stoichiometric. Silicide contacts can also be deposited by direct sputtering of the compound or by ion implantation of the transition metal followed by annealing. Aluminum is another important contact metal for silicon which can be used with either the n-type or p-type semiconductor. As with other reactive metals, Al contributes to contact formation by consuming the oxygen in the native oxide. Silicides have largely replaced Al in part because the more refractory materials are less prone to diffuse into unintended areas especially during subsequent high-temperature processing.

Formation of contacts to compound semiconductors is considerably more difficult than with silicon. For example, GaAs surfaces tend to lose arsenic and the trend towards As loss can be considerably exacerbated by the deposition of metal. In addition, the volatility of As limits the amount of post-deposition annealing that GaAs devices will tolerate. One solution for GaAs and other compound semiconductors is to deposit a low-bandgap alloy contact layer as opposed to a heavily doped layer. For example, GaAs itself has a smaller bandgap than AlGaAs and so a layer of GaAs near its surface can promote ohmic behavior. In general the technology of ohmic contacts for III-V and II-VI semiconductors is much less developed than for Si.

Material	Contact materials
Si	Al, Al-Si, $TiSi_2$, TiN, W, $MoSi_2$, PtSi, $CoSi_2$, WSi_2
Ge	In, AuGa, AuSb
GaAs	AuGe (http://www.semiconfareast.com/ohmic_table.htm), PdGe, Ti/Pt/Au

GaN	Ti/Al/Ti/Au (http://scitation.aip.org/getabs/servlet/GetabsServlet?prog=normal&id=JVTBD9000020000004001444000001&idtype=cvips&gifs=yes), Pd/Au (http://scitation.aip.org/getabs/servlet/GetabsServlet?prog=normal&id=APPLAB000073000020002953000001&idtype=cvips&gifs=yes)
InSb	In
ZnO	$InSnO_2$, Al
$CuIn_{1-x}Ga_xSe_2$	Mo, $InSnO_2$
HgCdTe	In

Transparent or semi-transparent contacts are necessary for active matrix LCD displays, optoelectronic devices such as laser diodes and photovoltaics. The most popular choice is indium tin oxide, a metal that is formed by reactive sputtering of an In-Sn target in an oxide atmosphere.

Significance

The RC time constant associated with contact resistance can limit the frequency response of devices. The charging and discharging of the leads resistance is a major cause of power dissipation in high clock rate digital electronics. Contact resistance causes power dissipation via Joule heating in low frequency and analog circuits (for example, solar cells) made from less common semiconductors. The establishment of a contact fabrication methodology is a critical part of the technological development of any new semiconductor. Electromigration and delamination at contacts are also a limitation on the lifetime of electronic devices.

References

- Sze, S.M. (1981). *Physics of Semiconductor Devices*. John Wiley & Sons. ISBN 0-471-05661-8. Discussion of theory plus device implications.

- Zangwill, Andrew (1988). *Physics at Surfaces*. Cambridge University Press. ISBN 0-521-34752-1. Approaches contacts from point of view of surface states and reconstruction.

See also

- The American Vacuum Society (http://www.avs.org/) has an excellent short course (http://www.avs.org/course.instructor.static.popup.aspx?FileName=semicontacts) on this topic.
- Journal of the American Vacuum Society (http://www.avs.org/literature.aspx), Thin Solid Films (http://www.elsevier.com/locate/issn/00406090) and Journal of the Electrochemical Society (http://www.electrochem.org/publications/jes/journal.htm) are journals that publish current research on ohmic contacts.

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